

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A charge read-out method, comprising:
moving charges into a plurality of charge transfer paths disposed on both sides along a row of a plurality of light receiving units arranged linearly, the charges being generated and stored in the plurality of light receiving units having received light; and
transferring and outputting the moved charges along the charge transfer paths disposed on both sides of the plurality of light receiving units, wherein each of the plurality of light receiving units is connected to a light receiving path on each side to permit the charges to exit from both sides of the light receiving units; and
obtaining a signal value indicating quantity of light received by a light receiving unit from the plurality of light receiving units, wherein the signal value is obtained by adding charges that have been accumulated in the same light receiving unit and that were separated to move through different light receiving paths positioned on each side of the same light receiving unit, wherein said each light receiving unit is a single, integrally formed, storage container for storing the generated charges.

2. (currently amended): A solid-state imaging device, comprising:
a plurality of light receiving units arranged linearly for receiving light to generate and store charges;

a plurality of charge transfer paths disposed on both sides of said plurality of light receiving units for receiving the charges exiting from said plurality of light receiving units and for transferring and outputting the received charges;

a controller for moving the charges stored in said plurality of light receiving units into said plurality of charge transfer paths, and for transferring and outputting the charges moved into said plurality of charge transfer paths disposed on both sides of said plurality of light receiving units; and

an addition unit for obtaining a signal value indicating quantity of light received by a light receiving unit from the plurality of light receiving units, wherein the signal value is obtained by adding charges that have been accumulated in the same light receiving unit and that were separated to move through different light receiving paths positioned on each side of the same light receiving unit,

wherein said each light receiving unit is a single, integrally formed, storage container for the received charges.

3. (currently amended): A solid-state imaging device comprising:

a plurality of light receiving units arranged linearly for receiving light to generate and store charges;

a plurality of charge transfer paths disposed on both sides of said plurality of light receiving units for receiving the charges exiting from said plurality of light receiving units and for transferring and outputting the received charges;

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a controller for moving the charges stored in said plurality of light receiving units into said plurality of charge transfer paths, and for transferring and outputting the charges moved into said plurality of charge transfer paths disposed on both sides of said plurality of light receiving units, wherein each of said plurality of light receiving units includes a plurality of segments separated by an internal potential barrier so that charges stored in said plurality of light receiving units are moved to said plurality of charge transfer paths; and

an addition unit for obtaining a signal value indicating quantity of light received by a light receiving unit from the plurality of light receiving units, wherein the signal value is obtained by adding charges that have been accumulated in the same light receiving unit and that were separated to move through different light receiving paths positioned on each side of the same light receiving unit,

wherein said each of said plurality of light receiving units is a single, integrally formed, storage container for the received charges.

4. (currently amended): The solid-state imaging device according to claim 3, wherein the plurality of segments are four segments obtained by separating each of said plurality of light receiving units with aan internal cruciform potential barrier.

5. (currently amended): The charge read-out method according to claim 1, wherein each of the plurality of light receiving units is connected to a light receiving path on at least two sides to permit the charges to exit from both sides of the light receiving unit and wherein said each

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light receiving unit stores generated charges for at most a single pixel~~is a single, integrally formed, storage container for storing the generated charges.~~

6. (currently amended): The solid-state imaging device according to claim 2, wherein each of the plurality of light receiving units is directly connected to at least two transmission gates, and wherein each of the two transmission gates facilitates transmission of the charge from its respective light receiving unit to a charge transfer path, and wherein said each light receiving unit stores generated charges for at most a single pixel~~is a single, integrally formed, storage container for the received charges.~~

7. (previously presented): The solid-state imaging device according to claim 2, wherein the charges from a light receiving unit of the plurality of light receiving units exit the light receiving unit on both sides and are transmitted to a respective charge transfer path from the plurality of charge transfer paths.

8. (currently amended): The solid-state imaging device according to claim 3, wherein the internal barrier comprises: a first conductive impurity layer and a second conductive impurity layer selectively formed on top of the first conductive impurity layer, the second conductive impurity layer has a surface covered with a first conductive high density layer in a light receiving unit from the plurality of light receiving units, and wherein the second conductive impurity layer or the first conductive impurity layer is of relative low density.

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9. (currently amended): The solid-state imaging device according to claim 3, wherein the internal barrier comprises a PNP structure formed on a p-substrate.

10. (currently amended): The solid-state imaging device according to claim 3, wherein the internal barrier is provided without impeding photoelectric conversion of its respective light receiving unit.

11. (currently amended): The solid-state imaging device according to claim 3, wherein the segments separated by the internal potential barrier are triangularly shaped.

12. (currently amended): The solid-state imaging device according to claim 3, wherein the internal potential barrier diagonally divides a light receiving unit from the plurality of light receiving units into segments.

13. - 14. (canceled).

15. (currently amended): The solid-state imaging device according to claim 3, wherein the plurality of charge transfer paths are vertical paths disposed on both sides of each of said plurality of light receiving units, and wherein charges exiting from each of said plurality of light receiving units are received by charge transfers paths on both sides of a respective light receiving unit and are subsequently converted into digital values by a converter.

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16. (currently amended): The solid-state imaging device according to claim 3, wherein said each light receiving unit stores ~~the~~ generated charges for at most a single pixel and wherein said each light receiving unit has at least two exits for the charges.

17. (currently amended): The solid-state imaging device according to claim 16, wherein each of the at least two exits is connected to a separate charge transfer path of said plurality of charge transfer paths, and wherein the plurality of charge transfer paths transfer the charges to a converter converting the charges to digital values.

18. (new): The charge read-out method according to claim 1, wherein the charges from the charge transfer paths are subsequently converted into digital values and wherein said each light receiving unit stores generated charges for only one single pixel.

19. (new): The charge read-out method according to claim 1, wherein the charge transfers paths are vertical paths transferring charges for subsequent conversion into digital form.

20. (new): The solid-state imaging device according to claim 2, wherein the charge transfer paths are vertical paths that transfer charges to be read.

21. (new): The solid-state imaging device according to claim 3, wherein said plurality of charge transfer paths are common, vertical charge transfer paths for transferring charges subsequently read.

22. (new): The solid-state imaging device according to claim 3, wherein each of said plurality of charge transfer paths transfer charges from more than one light receiving unit.

23. (new): A solid-state imaging device for detecting radiation images, comprising:
a plurality of linearly arranged light receiving units for detecting stimulated emission light generated from storage phosphor sheets by scanning with excitation light and for storing charges generated by detecting the stimulated emission light,

wherein each of the plurality of light receiving units is a single, integrally formed storage container for storing the generated charges and comprises a first charge exit to exhaust a first portion of charges generated in the light receiving unit to the exterior of the light receiving unit and a second charge exit different from the first charge exit to exhaust a second portion of charges to the exterior of the light receiving unit, wherein the second portion of charges is other charges different from said first portion of charges;

a first charge transfer path connected to the first charge exit, and disposed along the linearly arranged light receiving units, for receiving the first portion of charges exhausted from the first charge exit and for transferring the first portion of charges;

a second charge transfer path, different from the first transfer path connected to the second charge exit, and disposed along the linearly arranged light receiving units, for receiving the second portion of charges exhausted from the second charge exit and for transferring the second portion of charges; and

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an adding unit that adds a first charge signal obtained based on the first portion of charges which are transferred through the first charge transfer path and a second charges signal obtained based on the second portion of charge which are transferred through the second charge transfer path, said first portion of charges and said second portion of charges being exhausted from the same light receiving unit at the same time through the first charge exit and the second charge exit.

24 (new): A solid-state imaging device according to Claim 23, wherein the first charge exit and the second charge exit face each other and wherein the same light receiving unit is positioned in between the first charge exit and the second charge exit.